

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
----------------	---

System Components:

Web-based application:	Eureka is a web-based application that allows system modifications to be performed on the server and requires no client installation or modification. It has been architected to securely operate on the Public Internet.
Operating System:	Microsoft Windows 2008
Web-browser	Internet Explorer 8.0
Database:	Microsoft SQL Server 2008 Enterprise (Encryption feature turned on)
Framework:	. NET 3.5
Development Language:	C# and ASP .NET
Data Transport Protocol:	ODBC, ADO, ADO.NET, XML
Graphical User Interface:	Web-based graphical user interface incorporating Silverlight
Client Hosting Options:	Clients determine where to host their system
Client Specific Data Items:	System is designed for efficient customization of client specific data items
Integrated Development Environment:	Microsoft Visual Studio 2010

Features and Functions:

Administration Features	<p>Allow central and regional administrators to specify users and workload assignments.</p> <p>User Administration (Regional Specific)</p> <ul style="list-style-type: none">User ID and PasswordUser Capabilities (What each userID is allowed to do)User Security (Starts at read-only and goes up.) <p>Reporting Sources Administration</p> <p>Contact Administration</p> <p>Physician Administration</p> <p>Physician Group Administration</p> <p>Workload Administration</p> <ul style="list-style-type: none">Interactive Processing Assignment QueueCase Finding Assignment QueueElectronic Pathology Assignment Queue
Admission (Abstract) Data on a Single Screen	<p>View/Entry Abstract Screen is a unique one-screen solution that presents all of the following information to the user:</p> <ul style="list-style-type: none">Primary patient identifiers (always on screen)

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	<p>All text from the original new case document (always on screen)</p> <p>All text and codes from the treatment areas (always on screen)</p> <p>All codes and data fields including:</p> <ul style="list-style-type: none"> Demographic Diagnosis Collaborative staging codes and derived fields Hospital Followup
Admission Processed Log	Allows a visual editor to easily locate and edit documents that were recently processed.
Business Rules Management Technology	BRM JBoss/Drools technology has been integrated into Eureka as the foundation for “continuous quality control” automation.
Electronic Pathology Report Processing	<p>Electronic pathology reports are directly uploaded into Eureka from pathology laboratories in the HL7 format. HL7 does not include coding for site, stage, or histology and is not readable in its raw form.</p> <p>Eureka formats the HL7 reports into a consistent screen presentation.</p> <p>The user can then view the report, add classification codes, ensure that the physician information is correct, and then attempt to link the pathology report to data already in Eureka.</p> <p>If the pathology report links (finds a match), it is applied to Eureka as followup data.</p> <p>If the pathology report does not link, it is sent to the Case Finding Subsystem.</p> <p>This process also allows the user to enter a new path report using a data input screen. Thus, when a regional specialist is reviewing path reports at a lab that does not send electronically reports to Eureka, the specialist can connect to the internet and enter pathology reports directly into Eureka and perform the process as described above.</p>
Electronic Pathology Report Processing Positive Case Identification (PCI)	<p>Some pathology labs do not want to send false positive path reports (that is non-reportable cases) to CCR until a Certified Tumor Registrar has determined that each path report does contain a reportable tumor.</p> <p>PCI allows the path lab to submit reports that do not contain patient identifiers.</p>

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	<p>A CTR discards non-reportable path reports.</p> <p>A CTR requests identifiers for reportable path reports.</p> <p>Path labs then transmit identifiers to match the valid, reportable tumors.</p>
<p>Casefinding Subsystem</p> <p>Definition: An integrated set of components that allow the registry to process and track an electronic document that might contain a report of cancer but currently has no matching registry case.</p>	<p>To meet the registry goal of making sure a case is created for each verified reportable cancer with the most accurate and complete information possible, Eureka has an integrated set of components that allow the registry to process and track an electronic document that might contain a report of cancer but currently has no matching registry case.</p> <p>Documents can enter Eureka that should link (match) to existing data. For example, pathology reports, active followup documents, and correction documents. When such documents do not match, they are sent to the Casefinding subsystem.</p> <p>Casefinding tracks all such probable cancer documents, generates followback packages, and allows for disposition of cases once the case is found and properly entered into or Eureka or are declared to be invalid. The general process is as follows:</p> <p>When Casefinding receives a document, it attempts to link the document. If it finds a link (match) it sends the document back to Eureka for normal processing. If there is no link, the process continues.</p> <p>Casefinding then groups like documents. For example, Eureka may have received several Correction documents for the same patient. Those documents are collected into a set and from that point on, handled as a single document (reducing user workload).</p> <p>Casefinding then prepares the followback documents (labels, letters, forms, and lists) and prints them when requested by the user.</p> <p>While casefinding is in progress, Casefinding provides tracking and aging information both on screens and printable reports.</p> <p>Before the followback package is physically mailed to a reporting source, Eureka performs linkage one final time.</p> <p>Once a followback package (physical mail or hand-carried lists) is returned to a region, the user can input the final disposition of the casefinding effort. Casefinding then stop tracking and reporting on the case in question.</p> <p>Eureka Casefinding includes the following integrated components:</p>

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	<ul style="list-style-type: none"> • Link/Relink an electronic document against the registry database • “Send to Casefinding” functions • Casefinding Assignment Queue (CFAQ) • Casefinding Work Assignment/Administration • Death Certificate Image retrieval/review/print • Link related casefinding documents together into sets • Perform Followback <ul style="list-style-type: none"> ○ Select source (physician, hospital, convalescent home, etc.) ○ Track status ○ Generate labels, lists, and letters based on status and source • Assign a disposition to clear the CFAQ task • Create a new admission in the registry database • Consolidate document with the registry admission when it arrives (pathology reports) • Link incoming case against casefinding documents • Rapid Case Ascertainment <p>Eureka Casefinding includes the following source documents:</p> <ul style="list-style-type: none"> • Pathology reports (both electronic and manually entered) • Passive follow-up documents <ul style="list-style-type: none"> ○ Death clearance documents mentioning cancer • Corrections • Active follow-up • Deletions • Co-Morbidity Reports
Change History	Record and view all changes to data.
Collaborative Stage Testing	Test and display the results of changes to staging codes. ¹
Comment Fields	Add details to various input fields.
Comprehensive Lists in Drop Down boxes	Drop down boxes that contain reference information reduce the need to use reference manuals and thus increase user efficiency.

¹ Collaborative Staging is a coding that derives AJCC, TNM, stage grouping, and SEER Summary Stage codes. If a Visual Editor should make a change to an incoming code, Eureka will re-run the CS Algorithm and provide the results (including error messages). (IE, test the changes)

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
Consolidation and Consolidation Resolution	Quality check consolidated data and resolve conflicts on one screen with all relevant source documents including multiple admissions (abstracts).
Consolidation (Automated)	Sophisticated consolidation rules allow the system to complete the majority of cases automatically.
Contact Management	List contacts and make the information available to other processes.
Correction Record Processing (from Reporting Facility)	Reporting facility updates made to previously submitted cases are transmitted to the central registry via update record (correction record, active follow-up record, deletion record) and automatically linked together and applied to the central database.
Data Entry Screens	Create new case documents, new pathology records, or new confidential mortality records.
Data Miner	Perform Ad Hoc queries, download query results, save query, and update data on production from query results
Database (DB) Inquiry	Look up patients and tumors.
Death Certificate View, Search, and Bulk Print	Store Death Certificate images and allow users to search, view, and bulk print images. DC images can then be integrated with followback packages in the Casefinding subsystem.
Death Certificate Only (Auto Abstract)	The system automatically creates “DCO” cases by electronically extracting information from death file records.
Delete Documents	Delete documents.
Deletion Record Processing	Reporting facility updates made to previously submitted cases are transmitted to the central registry via update record (correction record, active follow-up record, deletion record) and automatically linked together and applied to the central database.
Duplicate Resolution	Provides a screen for users to manually resolve potential duplicate admissions automatically identified by the system
EasyHelp	EasyHelp: Instant mouse-click access to site-specific coding standards.
Edits (Automatic)	Edits run at various stages of the process to test for interfiled errors, incorrect field entries, and inter-record errors.
Edits (DB Re-Edit)	DB Re-Edits can be run to recheck the edits on consolidated data and admission level data.
Entry Screen (New Case Admission)	Create a new case document from source materials such as a medical office record.
Entry Screens (Pathology, Case Finding,)	Create a new report of cancer from paper pathology reports, confidential morbidity reports, or radiation/oncology reports.
Error Reporting	Report errors with sufficient detail as to assist a visual editor to

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	locate and fix the error condition.
Extract Data for Other Systems	Extract data that can be transmitted to complementary data systems (non-Eureka).
Hospital Merge	During upload, the Hospital Merge feature identifies and keeps the correct hospital number from merged hospitals. Thus, this feature eliminates confusing hospital identifiers.
File View	View the contents of files (containing one or more incoming reports of cancer). Can be used to troubleshoot problem files or data.
Linking and Linkage Resolution (Manual)	Check a document and determine if it links (matches) consolidated data. Allows the user to create a new patient, tumor, and admission or to link the current document to a consolidated patient set.
Linkage (Automated)	An advanced probabilistic linkage engine identifies and automatically completes a high percentage of cases.
Merge Patients, Tumors, Admissions	Merge duplicate records and eliminate duplicates in the database. (Caused by data migrations.)
Hospital Reporting	Web-based direct data entry and update capability of case abstracts.
On-line System Change Requests (User support and request for new features)	Send a request for a bug fix or system enhancement to Eureka System Support.
On-line User Documentation	Provide operating instructions and user information on-line. (User Guides, Release Notes, & System Messages)
OR Flag Fields	Add details to over-write flag fields.
Passive Followup Unconsolidation	This feature allows a user to unconsolidated an incorrectly consolidated passive followup record.
Patient Set Management	Identify all documents and records (patient, tumor, admission, followup) that relate to one patient. Allow a visual editor to correct errors and run edits.
Physician Information Database	Complete physician information used to searching physicians by specialty, name, address, license number, office, medical group, etc. for the purpose of casefinding and folowback.
Physician Group Management	List medical groups, cross-reference them to the physicians in the group, and make them available to other processes.
Physician Management	List physicians and make the information available to other processes.
Physician Data Entry	Web-based access for direct data entry at the physician's office.
Print Admissions and IPAQ Work Lists	Print information that can be used for supervisory planning.
Process Active Followup, Correction, &	Apply most followup data automatically and allow a manual

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
Deletion Records	process for records that require human intervention.
Process Hospital Deletions	This feature allows a user to process hospital deletions and thus, eliminate unwanted Admissions from Eureka.
Process Geocode	Apply census data to consolidated tumor records.
Process Passive Followup	Apply most followup data automatically and allow a manual process for records that require human intervention.
Processed Record Log	Allows an editor to easily locate and edit documents that were recently processed.
Recoding Audit Module	Allows the Quality Control staff to identify and audit case abstracting discrepancies by specific sites, regions or other data items.
Reporting Source Management	List reporting sources, cross-reference them to the physicians and contacts and make them available to other processes.
Reports (Central Management Use)	Create standard reports for central management.
Reports (Regional Use)	Create standard reports for regional management.
Shared Data (Create)	Create data to be shared back to hospital data systems.
State Specific Data Items	Customizable screens and database that quickly allow registries to add state specific data items.
Studies Management	Associate patients with studies. The users can search for a patient using DB Inquiry and view the studies associate with a patient (if any). A researcher is allowed to upload lists of studies associated with specific patients and can check each patient for linkage (as needed). Users can search for a patient using DB Inquiry and view the studies associate with a patient (if any). Researchers can extract queries from the database showing relationships between studies and patients.
Unlink Patients, Tumors, Admissions	Unlink records that should not have been linked by manual or automatic processes (during data migration, for example).
Upload Electronic Documents	Upload all electronic documents used by Eureka.
Upload (Testing)	Reject unsuitable documents or corrupted data.
Upload (Check for Duplicate Files)	Reject duplicate files.
Upload and Apply Non-Eureka Data	Process data from other database systems and apply the data to consolidated data.
Upload Log	View and manage uploads.
Update/Correction Record Processing - from Reporting Facilities (Automated)	Reporting facility updates made to previously submitted cases are transmitted to the central registry via update record (correction record, active follow-up record, deletion record) and automatically linked together and applied to the central database.
Visual Edit Process	Perform quality assurance on new case documents.

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	(Admissions) One screen processing that leads to linkage and consolidation.
Visual Editing Bypass Option	Eureka is configurable to bypass all or parts of this process, using a percentage between 0 and 100.
Visual Editing Sampling	Eureka is configurable to bypass all or parts of this process, using case sampling algorithms.
Workload Distribution	Assign documents to individual users. Interactive Processing Assignment Queue (IPAQ) Electronics Pathology Assignment Queue (PPAQ) Casefinding Assignment Queue (CFAQ) Automatic Assignments of Workloads (option)
Architecture:	
Logical n-Tier Architecture	N-tier architecture: <ul style="list-style-type: none"> • Presentation Layer/User Interface • Business Logic • Data Access • Data (database)
Web-based Graphical User Interface	Web-based graphical user interface.
Scalable	Eureka is scalable in that it has the ability to continue to function well when its workload base is changed in size or volume and it has the ability to shift to updated hardware/software to take advantage of the changes to performance, storage, and technology.
Standards-based:	
Edits	Eureka presents an industry standard interface to any edits engine. This allows Eureka to customize and interchange edit programs per the customer's requirements. California Cancer Registry runs the CDC edits engine.
Compliant with NAACCR standards	Eureka is compliant with NAACCR data standards
Compliant with NPCR standards	Eureka is compliant with NPCR data standards
Compliant with NHIA version 2.	Eureka is compliant with NHIA version 2 standards
Compliant with SEER standards	Eureka is compliant with SEER data standards
Performance:	

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
----------------	---

Concurrent User Load Capability	Stress-tested to successfully handle 100 concurrent users making simultaneous calls to the Edits, Linkage (Matching) and Consolidation
Volume Capability	Running at CCR with ~4 million patient records, ~5 million tumor records, and ~6 million admission records on a 120-gigabyte database.
Database Search	Unique name returned in approximately two-seconds. Common name (Jon Smith) returned in approximately five-seconds.
Upload Processing	Upload processing runs in the background with no negative user performance impact. Available for user initiated processing day and night.

Security:

Support role-based capabilities	Role based capabilities include user, function, user "class" definition
Audit log of changes	All data changes are tracked with user identification and date/time information. Audit log is viewable through the application.
End to end encryption	Web-based (SSL) encrypted data transfer. IP access restrictions.
Adaptable to meet new security threats	Eureka architecture supports standards based security through VPN and other technologies.
Database Isolation	No user attaches directly to the database. In the multi-tier architecture, the database is isolated from both the client and business logic environments.
Password Restriction	Federal security standards enforced in Eureka.
Multi-organizational	Data access is restricted based on organizational capabilities.

Productivity:

Admission (Abstract) Data on a Single Screen	<p>View/Entry Abstract Screen is a unique one-screen solution that presents all of the following information to the user:</p> <ul style="list-style-type: none">Primary patient identifiers (always on screen)All text from the original new case document (always on screen)All text and codes from the treatment areas (always on screen)All codes and data fields including:<ul style="list-style-type: none">Demographic
--	---

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	<p>Diagnosis Collaborative staging codes and derived fields Hospital Followup</p>
<p>Visual Editing (Screening) on a Single Screen. Configurable bypass function available for registries that choose to operate without performing this function (see next characteristic)</p>	<p>For registries that perform Visual Editing (Screening), Eureka provides a unique single screen Visual Editing solution that presents all of the following information to the user on one screen:</p> <ul style="list-style-type: none"> Primary patient identifiers (always on screen) All text from the original new case document (always on screen) All text and codes from the treatment areas (always on screen) All codes and data fields including: <ul style="list-style-type: none"> Demographic Diagnosis Collaborative staging codes and derived fields Hospital Followup One button access is provided to: <ul style="list-style-type: none"> VE Query/Hold (The question and answer feature) Overwrite flag details Co-morbidity comparison fields Edit errors Comment details (Provided by users) Screen areas are color-coded. (See Admission Screen Color Cues, the next topic).
<p>Visual Editing - Bypass option for organizations that want to bypass all or parts of this process</p>	<p>Example: For registries not funded to complete 100% Visual Editing, Eureka is configurable to allow for complete or partial bypass of the Visual Editing process. For example, the CCR will bypass this step for specified high-quality, low-error abstractors in special circumstances. In this example, Eureka is configured to skip Visual Editing and open directly to the "Linkage" screen. This action can save minutes per new case. However, the Admission must meet a set of computer tested quality requirements. If it does not, it will open in Visual Editing so that the edit issue will be resolved, which is the normal process. Most Admissions from high-quality abstractors do meet the quality requirements and open directly into "Linkage", thus</p>

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	processing efficiency in increased by this feature.
Visual Editing Sampling-Configurable %	Allows for a configurable percentage from (0 to 100) of abstracts to be Visually Edited for QC purposes
Admission Screen Color Cues	<p>Eureka presents the users with a color-coding system that increases the efficiency and accuracy of quality control reviews (visual edits).</p> <p>Yellow identifies all fields that have been changed.</p> <p>Red identifies all buttons that when clicked, provide additional information such as:</p> <ul style="list-style-type: none"> Original Edit Errors OR Flags Query or Hold Comment details Co-morbidity comparison fields
Single Screen Consolidation with access to all source documents including multiple admissions (abstracts).	<p>On one screen, Eureka presents the user with the following information designed to allow efficient consolidation decisions.</p> <ul style="list-style-type: none"> Current document patient and followup information Current patient tumor information (including multiple tumors) Current patient treatment summary The in-process Admission (in its entirety) A Consolidation Conflict table that presents the user with a view of significant differences between source documents. <p>Eureka also provides one-button access to all other source documents which can include:</p> <ul style="list-style-type: none"> New Case Corrections Geocode Active followup Passive followup <p>Includes SS DMF, Medi-Cal, CMRI, Medicare, CalVoter, OSHPD, Death Clearance, CMS/SEER, NCOA, DMV, SSA, EPI, Accurint, Masterfiles, and NDI.</p> <p>The layout between documents is consistent, allowing intuitive comparison between the in-process document and historical</p>

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
	<p>documents. Documents are laid out side-by-side to facilitate comparisons. All data that has been changed, in-process and historical are color coded to indicate the changes.</p> <p>Screen areas are color-coded. (See Consolidation Screen Color Cues, the next topic).</p>
Capture Start and End times for Processes	<p>This feature captures the start and end times for various processes and screen uses. The data will be analyzed and used to increase organizational efficiency.</p>
Consolidation Screen Color Cues	<p>Consolidation presents the users with a color-coding system similar to the Admission screen, but with additional areas to be identified.</p> <p>Yellow or green identifies all fields that have been changed.</p> <p>Red identifies all buttons that when clicked, provide additional information such as:</p> <ul style="list-style-type: none"> Original Edit Errors OR Flags Query or Hold Show comment details Show contact details Co-morbidity comparison fields
Data Entry (Web-based) directly into system	<p>Create new case documents, new pathology records, or new confidential mortality records. Direct reporting of new case abstracts and other records types into the system expedites case reporting, and improves data quality and timeliness.</p>
Direct upload capability from reporting source	<p>Eureka is designed so that hospitals, clinics, and physician offices can upload documents directly to Eureka and monitor the progress of the uploads by viewing the upload log.</p>
Straight-through processing (vs. manual, batch hand-offs)	<p>Eureka allows an organization to choose its process for processing cancer documents.</p> <p>One user can processes the case through the three common stages of Visual Editing (quality control), Linking (matching), and Consolidation (when required).</p> <p>Or, the work can be assigned in sequence to specialists who handle Visual Editing or Linking or Consolidation.</p> <p>In all cases, Eureka processes each part of the sequence in real-time and does not have to wait for scheduled batch runs.</p>
Popup Windows	<p>With one click, users can view additional information about OR flags, queries, comments, contacts, collaborative staging, edit</p>

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
----------------	---

	errors, and co-morbidity comparison fields.
Automatically applied record processing	(Active Followup, Passive Followup, and Geocoding often apply with no human intervention. Typically 80% -100% of these record types auto-apply. The remaining records are exceptions that are set aside for a manual review and resolution. Linking and consolidation algorithms are under constant review and are improved frequently. Soon, only the most difficult documents will require manual handling. (Those with missing or invalid data)
Automatic Workload Assignment	Work can be auto-assigned to individual users based on administrator defined criterion such as record type, reporting source, site code, abstractor, date of diagnosis, etc.
Manual Workload Assignment	Work can be manually assigned, re-assigned, and de-assigned to individual users based on supervisory factors such as workload balancing, visual editor experience, abstractor experience, reporting sources, and processing stage. For example, work can be assigned by its processing stage such as visual editing, linking, or consolidation.
Automatic Record Matching Capability (Linking)	Linking (matching) decisions are made with a modifiable, weighted, probabilistic algorithm than can set a threshold for automatic linking and for providing a list of likely matches for manual review.
Automatic edits during upload	Edits are run during upload, after visual editing, and during consolidation. Initial edit errors (if any) can be viewed.
Admission (New Case Abstract) Process Log	Provides the users with a list of recently completed work that allow them to find documents for further review or to correct mistakes.

Management Reports:

Standard Report Writing Tool	Microsoft Reporting Services.
Standard reports	Complete set of 55+ Standard management reports (detailed list available).
Ad Hoc reports	The reports development team has access and can write ad hoc reports as requested by users.
Viewable, printable, and exportable.	Reports are viewable, printable, and exportable.

Support:

Helpdesk	Coverage provided M-F from 8am-5pm PST. Experienced helpdesk personnel help resolve data issues, case-processing
----------	--

Characteristics of the Eureka Data Management System

Features and Functions

Characteristic	Eureka Cancer Data Management System Description 2010
----------------	---

	issues, and provi
Online Problem Management Reporting, and Tracking	Web-based form provided for reporting, resolving, and tracking issues. CCR/PHI has a formal problem management process for resolving all problems.
Online User Manual	User manual available through a menu and updated for new or changed functionality.
Training <ol style="list-style-type: none">1. Initial User and Administrator2. Advanced Administrator3. Advanced User	Training is provided through special training manuals, teleconference classroom training, annual technical conference training classes for advanced users, and on-site training.
On-site Implementation Support	Eureka support staff provides two weeks of on-site support after each system implementation when users go “live” onto the system.
System Change Enhancement Process	Online Eureka System Change Request system. Requests are prioritized, documented, tracked, and put into a development work queue.